Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 31, 2018

PLANS APPROVAL DATE

Carl M. Duan No. C59976 Exp. 6-30-18 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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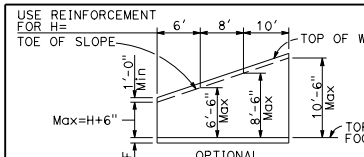
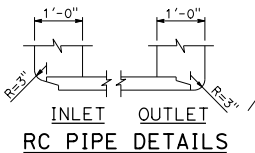
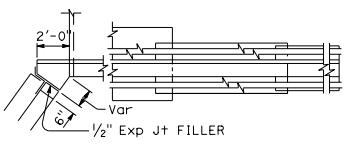
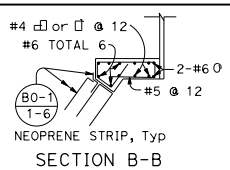


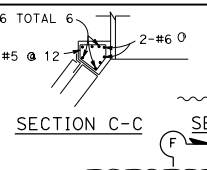


RC PIPE DETAILS

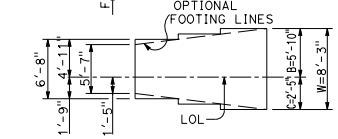




SECTION B-B



SECTION C-C SECTION D-D

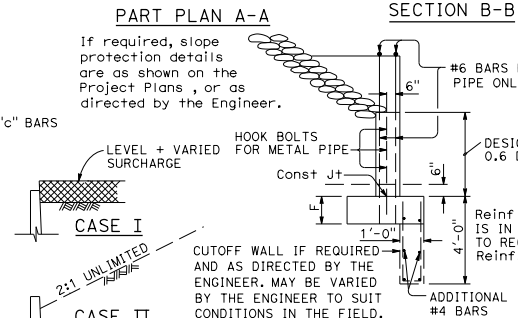


TYPICAL LAYOUT EXAMPLE

REINFORCED CONCRETE WINGWALLS

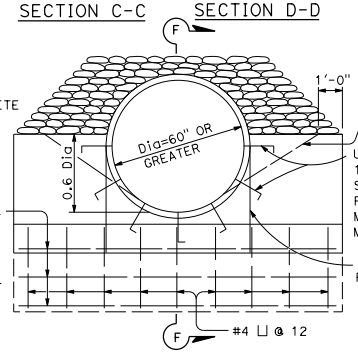
PART PLAN A-A

If required, slope protection details are as shown on the Project Plans , or as directed by the Engineer.

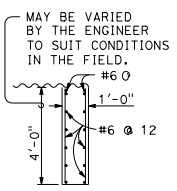


DETAIL OF DESIGN LOADING CASES

SECTION F-F



TYPE C WALL

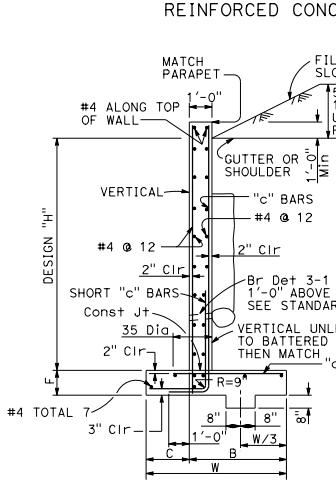


SECTION E-E

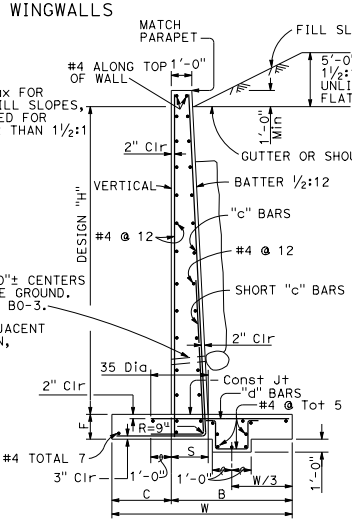
REINFORCED CONCRETE WINGWALLS

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"	11'-6"	11'-11"	12'-5"	12'-10"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"	3'-10"	4'-0"	4'-2"	4'-4"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-6"	6'-10"	7'-0"	7'-5"	7'-8"	7'-11"	8'-3"	8'-6"
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-5"	1'-5"	1'-6"	1'-6"	1'-8"	1'-10"	1'-10"	2'-0"	2'-0"
D	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
BATTER	None									½:12							
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6½"	1'-7"	1'-7½"	1'-8"	1'-8½"	1'-9"	1'-9½"	1'-10"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#6@9	#7@9	#7@8	#8@9	#7@7	#8@11	#9@12	#10@10	#10@10	#10@10	#10@9	#10@9	#11@9
"d" BARS	#5@12	#5@10	#6@11	#6@9	#6@9	#6@9	#6@8	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10	#9@10	#9@9	#9@9	#10@9
* Conc CY/LF	0.459	0.522	0.58	0.635	0.69	0.742	0.797	0.879	0.995	1.247	1.368	1.448	1.611	1.772	1.865	2.043	2.143
* Reinf LB/LF	26	32	41	50	59	70	81	95	102	99	120	156	171	181	190	217	267
** Case I qu (ksf), B' (ft)	3.75,2.24	3.66,2.69	3.59,3.11	3.56,3.49	3.52,3.89	3.52,4.21	3.69,4.46	3.77,4.77	3.89,5.17	3.92,5.61	3.92,6.18	4.03,6.40	4.13,6.95	4.28,7.26	4.39,7.57	4.65,7.82	4.85,8.02
** Case II qu (ksf), B' (ft)	1.16,5.58	1.33,6.13	1.51,6.55	1.69,6.86	1.88,7.16	2.08,7.33	2.29,7.60	2.50,7.86	2.77,8.14	2.97,8.47	3.18,8.93	3.41,9.05	3.70,9.43	4.02,9.58	4.26,9.80	4.57,10.05	4.82,10.27
** Case III qu (ksf), B' (ft)	1.26,5.46	1.36,5.97	1.49,6.37	1.64,6.66	1.79,6.93	1.95,7.08	2.11,7.33	2.28,7.55	2.50,7.84	2.66,8.12	2.81,8.59	3.00,8.69	3.22,9.10	3.49,9.18	3.65,9.79	3.89,9.74	4.07,9.96

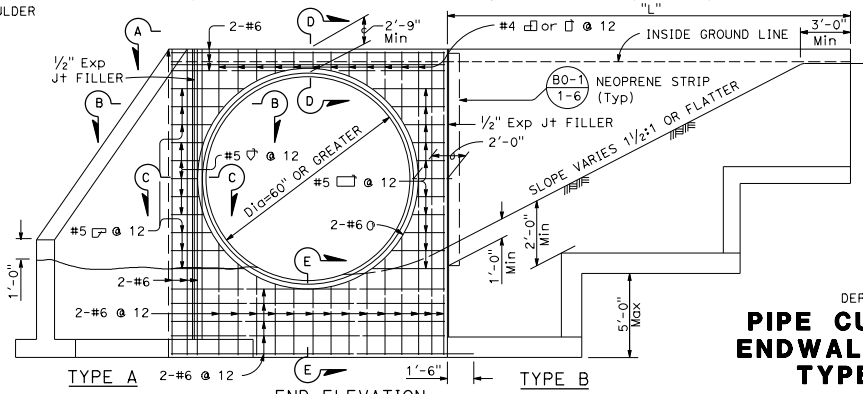
B'=B-(2) eccentricity, B' is the effective footing width.
* Quantities include 1'-0" extension above the design "H" limit.
** Soil pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2



TYPICAL SECTION H=4' THRU 12'



TYPICAL SECTION H=13' THRU 20'



STRAIGHT WINGWALLS

For footing step dimensions and reinforcement see "Footing Step" on Std Plan B3-5

NOTES:

Unit Stresses: fy = 60,000 psi
f'c = 3,600 psi
Earth density: 120 pcf
Equivalent fluid pressure: 36 pcf
Elevation, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Wall height may be exceeded by 6" before going to the next greater "H".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS TYPES A, B AND C

NO SCALE

D90

1-29-18